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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,517	12/09/2003	Erik S. Jeng	386998041US	3730
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PERKINS COIE LLP PATENT-SEA P.O. BOX 1247 SEATTLE, WA 98111-1247			EXAMINER LEE, EUGENE	
			ART UNIT 2815	PAPER NUMBER

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/731,517

Applicant(s)

JENG, ERIK S.

Examiner

Eugene Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) 9-12 and 25-52 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/20/05 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Species I (claims 1-8, and 13-24) in the reply filed on 11/29/05 is acknowledged. The traversal is on the ground(s) that the claims are generic. This is not found persuasive because even though some claims may be generic, the application contains the disclosure of 22 species. In the case that the elected claims are allowed, and are generic, the applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a). The requirement is still deemed proper and is therefore made FINAL.

Claims 9 thru 12, and 25 thru 52 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 11/29/05.

### ***Drawings***

2. The drawings are objected to because it appears on page 7, line 25, that conductive layer 4 should be conductive layer 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an

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amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: element 14a, 14b (see, for example, Figure 7). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

*Specification*

4. The disclosure is objected to because of the following informalities: on page 6, paragraph [0026], there is an unnecessary “t”; and page 9, paragraph [0042], the word “alternative” is misspelled.

Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al. 5,969,383. Chang discloses (see, for example, FIG. 1) an NVM cell (nonvolatile memory device) 10 comprising a semiconductor substrate 11, dielectric layer of silicon dioxide layer (gate oxide) 14, gate (control gate structure) 16, silicon dioxide layer (first isolation layer) 23, silicon dioxide layers (first spacers) 28, source/drain (source and drain regions) 36, 22, silicide structures (salicide) 42, 44, 46.

Regarding the limitation “control gate structure”, even though Chang calls the gate 16 a select gate, this limitation is descriptive in nature and does not **structurally** differentiate Chang’s invention from the applicant’s invention. Chang and the applicant’s invention disclose the same

structural gate wherein the gate is formed above a substrate surrounded by spacers. The limitation “control” is only a label that does not structurally differentiate Chang’s invention.

Regarding the limitation “wherein said first spacers include charge trapping capability thereby storing single or multiple bits of data”, it has been held that the recitation that an element is “capable of” performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchison, 69 USPQ 138. In this case, Chang discloses (see, for example, FIG. 1) an NVM cell wherein the NVM cell contains two ONO stacks 28. Each of these ONO stacks are capable of storing a bit.

Regarding the limitation “silicide optionally formed on said control gate”, this limitation does not concretely state whether the nonvolatile memory contains a silicide or not. It does not constitute a limitation in any patentable sense.

Regarding claim 5, see, for example, FIG. 1 wherein Chang discloses a silicon nitride layer (second isolation layer) 24.

Regarding claim 14, see, for example, FIG. 1 wherein Chang discloses an NVM cell (nonvolatile memory device) 10 comprising a semiconductor substrate 11, dielectric layer of silicon dioxide layer (gate oxide) 14, gate (gate structure) 16, silicon dioxide layer (first isolation layer) 23, nitride spacers (first spacers) 34, 35, source/drain (source and drain regions) 36, 22, silicide structures (salicide) 42, 44, 46.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 3, 6, 7, and 15 thru 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. '383 as applied to claims 1, 5, 9, 13, and 14 above, and further in view of Zheng et al. 6,762,085 B2. Chang does not disclose a pocket implantation region. However, Zheng discloses (see, for example, FIG. 10) a first region 30 comprising an N type source/drain region 9, and a p type halo region (pocket implantation region) 7. In column 3, lines 44-53, Zheng discloses the halo region reducing the risk of punch through, or leakage. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have a pocket implantation region in order to reduce the risk of punch through, or leakage.

Regarding claim 3, Chang does not disclose a lightly doped drain region. However, Zheng discloses (see, for example, FIG. 10) a first region 30 comprising an N type LDD region (lightly doped drain region) 8. It would have been obvious to one of ordinary skill in the art at time of invention to have a lightly doped drain region in order to relax the electric field and reduce leakage current.

Regarding claims 6, and 7, see, for example, FIG. 1 wherein Chang discloses a silicon nitride layer (second isolation layer) 24.

Regarding claims 15, 18, and 21, Chang does not disclose the silicide material including  $\text{TiSi}_2$ ,  $\text{CoSi}_2$ , or  $\text{NiSi}$ . However, Zheng discloses (see, for example, FIG. 10, and column 5, lines 27-29) silicide layers 16 comprising titanium silicide, cobalt silicide, and nickel silicide. It would have been obvious to one of ordinary skill in the art at the time of invention to have the silicide material including  $\text{TiSi}_2$ ,  $\text{CoSi}_2$ , or  $\text{NiSi}$  since it has been held to be within the general

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skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (In re Leshin, 125 USPQ 416) in order to have an adequate conductive material that reduces parasitic resistance.

Regarding claims 17, and 20, see, for example, FIG. 1 wherein Chang discloses an NVM cell (nonvolatile memory device) 10 comprising a semiconductor substrate 11, dielectric layer of silicon dioxide layer (gate oxide) 14, gate (gate structure) 16, silicon dioxide layer (first isolation layer) 23, nitride spacers (first spacers) 34, 35, source/drain (source and drain regions) 36, 22, silicide structures (salicide) 42, 44, 46.

9. Claims 4, 8, and 22 thru 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. '383 as applied to claims 1, 5, 13, and 14 above, and further in view of Kasuya 6,784,078 B2, and further in view of Zheng et al. 6,762,085 B2. Chang does not disclose a double doped drain region. However, Kasuya discloses (see, for example, Fig. 1) a semiconductor device comprising a high concentration impurity diffusion region 44, and a low concentration impurity diffusion region (double doped drain region) 42. It would have been obvious to one of ordinary skill in the art at the time of invention to have a double doped drain region in order to enclose the source/drain region, and reduce leakage current.

Chang in view of Kasuya does not disclose a pocket implantation region. However, Zheng discloses (see, for example, FIG. 10) a first region 30 comprising an N type source/drain region 9, and a p type halo region (pocket implantation region) 7. In column 3, lines 44-53, Zheng discloses the halo region reducing the risk of punch through, or leakage. Therefore, it



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would have been obvious to one of ordinary skill in the art at the time of invention to have a pocket implantation region in order to reduce the risk of punch through, or leakage.

Regarding claim 8, see, for example, FIG. 1 wherein Chang discloses silicon nitride layer (second isolation layer) 24.

Regarding claim 23, see, for example, FIG. 1 wherein Chang discloses an NVM cell (nonvolatile memory device) 10 comprising a semiconductor substrate 11, dielectric layer of silicon dioxide layer (gate oxide) 14, gate (gate structure) 16, silicon dioxide layer (first isolation layer) 23, nitride spacers (first spacers) 34, 35, source/drain (source and drain regions) 36, 22, and silicide structures (salicide) 42, 44, 46.

Regarding claim 24, Chang in view of Kasuya does not disclose the silicide material including  $\text{TiSi}_2$ ,  $\text{CoSi}_2$ , or  $\text{NiSi}$ . However, Zheng discloses (see, for example, FIG. 10, and column 5, lines 27-29) silicide layers 16 comprising titanium silicide, cobalt silicide, and nickel silicide. It would have been obvious to one of ordinary skill in the art at the time of invention to have the silicide material including  $\text{TiSi}_2$ ,  $\text{CoSi}_2$ , or  $\text{NiSi}$  since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (In re Leshin, 125 USPQ 416) in order to have an adequate conductive material that reduces parasitic resistance.

### ***Response to Arguments***

10. Applicant's arguments with respect to claims 1-8, and 13-24 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

**INFORMATION ON HOW TO CONTACT THE USPTO**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee  
February 6, 2006

A handwritten signature in black ink, appearing to be 'E. Lee', with a large, stylized loop at the end.